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DISASTER RISK MANAGEMENT IN NIGERIAN RURAL AND URBAN SETTLEMENTS



THE NIGERIAN INSTITUTE
OF TOWN PLANNERS (NITP)

Edited by:
Bolanle Wahab
Nathaniel Atebije
Ibrahim Yunusa



TOWN PLANNERS REGISTRATION
COUNCIL OF NIGERIA (TOPREC)

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Dedication



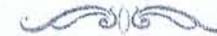
This book is dedicated to the living memory of:
Tpl Chief A. B. C. Obi, PPTOPREC, FNITP, RTP
President of the Town Planners Registration
Council of Nigeria

He died on August 24, 2013 in active service on his return trip to Enugu after attending a Council Meeting of the NITP in Abuja.

Chapter 1

Disaster Risk Management in Nigerian Human Settlements

Bolanle Wahab



1. Introduction

The number of reported major catastrophes and their impact on social and economic development has been increasing worldwide. With the growing of world population, the potential for human-induced and natural disaster is growing daily. According to Munich Re (2004), over the last decade, around 7,000 natural disasters including earthquakes, volcanic eruptions, tropical cyclones, floods and droughts have occurred, killing more than 300,000 people and causing over US\$ 800 billion in economic losses. There is a general agreement amongst scientists that the climate of the planet earth is undergoing intractable changes as evident in rising temperature and excessive rainfall leading to flooding. As a result of global climate

change and climate variability, the frequency and intensity of climate-related events are likely to increase. The consequences of average temperature rises include changes in rainfall amounts and patterns which have, in recent years, led to disasters of all descriptions particularly flooding.

On Monday, 20 May, 2013, a deadly tornado tore through the Oklahoma City suburb of Moore, in USA with stunning devastations killing at least 51 people while destroying entire tracts of homes, piling cars atop one another, and trapping two dozen school children beneath rubble. 20 of the 51 dead and 45 of the 230 injured were school children. On Tuesday, June 11, 2013, there was flooding in Central Europe, affecting the Czech Republic, Germany, Hungary, Poland, Slovakia, Switzerland and Austria, which left 6 dead and forced thousands to flee their homes. The flooding began after several days of heavy rain in late May and early June 2013 which led to high water and flooding along Elbe and Danube drainage basins and tributaries. May 2013 had been one of the three wettest in the last 156 years in Austria, together with the years 1962 and 1965 (Wikipedia, 2013). Flooding is an annual occurrence in India, which is caused by the monsoon rains that the country depends upon for agriculture. The torrential rain and floods of Sunday, June 16 in Lucknow, India washed away buildings and roads, killing at least 23 people in the northern Indian state of Uttarakhnad.

Disasters are now occurring at a scale and frequency that is causing unprecedented impacts worldwide. Every year, more than 200 million people are affected by droughts, floods, cyclones, tsunamis, earthquakes, wild fires and other disasters associated with natural hazards (UNDRP, 2008). One simple reason is that the world's population is higher than ever before; thus there are more human beings to be potentially impacted, and more are being forced to live in high-risk areas (Inforresources, 2009). While all countries may be confronted with natural hazards, as noted by Herrmann et al. (2004), the poorer developing countries, in particular, are disproportionately vulnerable to those hazards turning into

disasters. Every nation in Africa suffers from environmental problems such as wind erosion, floods, untreated sewage, bush burning, oil spillages, air pollution and irresponsible waste disposal. Many of the cities in Africa face high risk from climate change impacts. Vulnerabilities are heightened by the poor quality of housing, infrastructure, drainage and sea defences. The realities of climate change are evident in several Nigerian coastal and inland cities where flooding has become more frequent, intense and occurring in locations previously not at risk.

Human settlements in Nigeria are largely characterised by substandard housing; inadequate and poor or, in many cases, outright absence of basic infrastructural facilities and services; poor environmental sanitation; air, water and noise pollution; and other observable indices of declining settlements quality such as unemployment or underemployment; overcrowding; incessant civil unrest; ethno-religious conflicts; infectious diseases; prostitution, sexually transmitted infections, crime, national budget crisis, and unions' strike actions. The result is that most of the settlements, including urban agglomerations, have paradoxically become centres of excellence in urban squalor and aggravated poverty, exhibiting human misery, training grounds for various types of gangsterism, diverse category of civil and violent crimes and perhaps more despairingly, an apparent absence of credible, futuristic and sustainable urban management and physical planning system which could evolve alternative future for the contemporary settlement systems. The combination of all these environmental challenges creates instant recipe for human-induced and nature induced disasters (see Table 1 for a list of disasters common in Nigeria). In 2012, over 80 percent of the thirty-six states in Nigeria experienced flooding; there were also several incidents of fire disasters, oil spillage, wind storm, erosion, building collapse and drought, temperature extreme and siltation.

One simple cause of all these disasters is that the world's population is higher than ever before; thus, there are more human beings to be

potentially impacted, and more are being forced to live in high-risk areas. In most of the Nigerian coastal and inland cities, there are hazard-prone areas: encroached flood-plains, edges of ravine (deep narrow valley), flood-prone embankments, slopes liable to mud-slide or collapse, densely packed areas where fires easily start, on roundabouts and busy intersections. In all of these, however, experiences have indicated insufficient information and preparation in Nigerian rural and urban communities to combat disasters, thereby making Nigerian stakeholders' responses to be reactionary in the form of providing relief materials to affected population.

The near zero involvement of physical planning agencies and practitioners in Nigeria in DRM is a trend that needs to be reversed by providing required knowledge to professionals in urban and regional planning and allied fields to minimize vulnerabilities and disaster risks and their impacts in rural and urban communities. This is what informed the theme of the 2013 Mandatory Continuing Professional Development Programme (MCPDP) "**Disaster Risk Management in Nigerian Rural and Urban Settlements**" by the joint Councils of the Nigerian Institute of Town Planners (NITP) and the Town Planners Registration Council of Nigeria (TOPREC). This book is a collection of the presentations made at the 2013 training programme. This introductory chapter discusses the state of disaster risk management in Nigerian human settlements. It starts with the definitions of relevant terms followed with types of natural and human-induced disasters in Nigeria, exposure and vulnerability of human settlements to disaster, disaster management strategy, developmental attributes of disasters, and the roles of urban and regional planners in disaster risk management.

2. Conceptual Definitions

Some terms and concepts that are considered to be germane to the understanding of the contents of this chapter are explained in the following sub-sections.

2.1 Hazard

A hazard is a geological, hydrological or geomorphological phenomenon which poses a threat to humans and their activities (Doornkamp 1989). It is a potential danger or a source of danger which threatens human safety when provoked. Hazard is thus a potentially damaging physical event or disaster triggers that can cause harm or risk, such as earthquakes, floods drought, storms, fires, lightning, volcanic eruption, hurricanes, and tornadoes. These physical triggers are referred to as natural hazards. They can wipe out years of urban development by destroying infrastructure, weakening of urban support or service institutions and killing people. ethnic/religious or political strives are man-made hazards.

2.2 Resilience:

Resilience is the ability of a system, community or society exposed to hazards to resist, absorb, accommodate and recover from the effects of a hazard in a timely and efficient manner including through preparation and restoration of its essential basic structures and functions (UNISDR, 2012).

2.3 Vulnerability:

The characteristics and circumstances of a community system or asset that make it susceptible to the damaging effects of a hazard are referred to as vulnerability (UNISDR, 2012). In other words, it is the extent to which community systems are at risk by living in areas of hazards. Two distinct types of vulnerability are common in most communities: (i) people vulnerability which is the extent to which people are at risk, and (ii) institutional/infrastructural vulnerability which is the extent to which schools, health and other institutions as well as utilities and services such as: electricity-, gas- and water supply; communication facilities including telephone, radio and television, emergency response networks etc are at risk. Vulnerability can arise from physical, social, cultural, economic, political and environmental factors. Sub-standard design and poor construction of buildings or hydraulic structures including dams,

poor waste management, and inadequate budgetary allocation for risk management measures are examples.

2.4 Disaster

A disaster is a sudden event (emergency) caused by natural or human-induced actions resulting in significant change in circumstances over a relatively short period of time. Such emergency is characterized by death, displacement, diseases, loss of crops, damage to physical and service infrastructure, depletion of social and natural capital, institutional weakening and general disruption in economic and social activity (Olorunfemi and Raheem, 2008). A disaster is also the consequence of inappropriately managed risk. UNISDR (2012) described disaster as a serious disruption to the functioning of a society with widespread human, material, or environmental losses which exceed the ability of affected society to cope using only its own resources. A disaster occurs when hazards and vulnerabilities meet (see Fig. 1). Twigg (1998) contended that there are no such things as natural disasters, but there are natural hazards. A disaster is the result of a hazard's impact on the society. Hence, the effects of a disaster are determined by the extent of a community's vulnerability to the hazard or, conversely, its ability or capacity to cope with it. Thus, vulnerability is not natural but the result of an entire range of constantly changing physical, social, economic, cultural, political and even psychological factors, especially in urban settings, that shape people's lives and create the environments in which they live. For that reason, natural disasters could be seen as nature's judgement on what humans have wrought. A number of disasters have affected Nigeria such as oil spills in Niger Delta, pipeline vandalism in Eastern and Western parts of the country, industrial pollution in urban areas, collapsed buildings in Nigeria's major cities such as Lagos, Abuja, Port Harcourt and Kano among others. Floods have ravaged parts of the country and particularly so in 2012; desertification/drought in the North has triggered off migratory movements which cause a lot of unrests; erosion in the South East is leading to the loss of vast community land, while windstorms and ethno-religious conflicts in the

Northern part are also taking a toll on human lives, destroying properties and creating groups of refugees. Due to the relative high cost and poor results associated with the crisis management (response) phase of disaster management compared to the high positive outcomes and low cost (benefits) of the Risk Management (Disaster Prevention, Mitigation & Preparedness) phase, more emphasis is now being put on Disaster Risk Reduction all over the world.

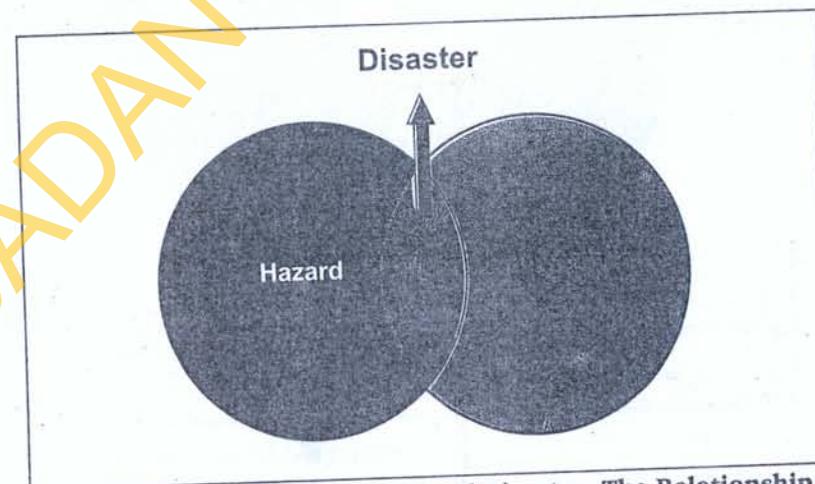


Figure 1: Hazard, Vulnerability, and Disaster: The Relationship
Source: Khan et al. (2008)

2.5 Disaster Risk:

Risk is defined by UNISDR (2012) as the combination of the probability of an event and its negative consequences. It is the product of both the degree of exposure to a hazard and sensitivity (vulnerability) of the affected population to that hazard. Disaster risk on the other hand, refers to the potential disaster losses in lives, health status, livelihoods, assets and services which could occur to a particular community or a society over specified future time period.

2.6 Disaster Risk Reduction (DRR)

Disaster Risk Reduction (DRR) is defined as measures designed to protect livelihoods and the assets of communities and individuals from the impact of hazards. It is a conceptual framework intended to systematically avoid (prevent) and limit (prepare/mitigate) disaster risks with regard to losses in lives and the social, economic and environmental assets of communities and countries (Infocources, 2009). The targets of DRR are:

- I. Reducing socio-economic vulnerabilities to disasters; and
- ii. Dealing with the environmental and other hazards that trigger them.

2.7 Disaster Risk Management (DRM)

Disaster Management is a process which involves the coordination and integration of all activities necessary to build, sustain and improve the capability (of people) for disaster prevention, mitigation, preparedness, response and recovery (see Fig. 2). **Disaster Risk Management** is the systematic process of using administrative directives, organization and operational skills and capacities to implement strategies, policies and improved coping capacities in order to lessen the adverse impact of hazards and the possibilities of disasters is referred to as Disaster Risk Management (UNISDR, 2012). It is the concept and practice of reducing disaster risks through systematic efforts to analyse and manage the causal factors of disasters through:

- i. reduced exposure to hazards;
- ii. lessened vulnerability of people and property;
- iii. wise management of land and environment, and improved preparedness for adverse effects



Figure 2: Disaster Management

Source: Khan et al. (2008, p.47); <http://www.mnmk.ro/documents/2008/2008-6.pdf>

Disaster Management Cycle (DMC) refers to a series of expected actions in stages, to prevent, mitigate or prepare and response to disaster. These actions are usually presented as requirements before, during or after a disaster occurrence. The goal of the cycle is to reduce or avoid losses from hazards, ensure prompt assistance to victims and achieve rapid and effective recovery. The cycle consists mainly of preparation, response, recovery and mitigation (see Fig. 3). In contemporary disaster management practice, these activities go on simultaneously.



Figure 3: Cycle of Disaster Management

Source: Khan et al. (2008, p.49); <http://www.mnmk.ro/documents/2008/2008-6.pdf>

3. Natural and Human-induced Disasters in Nigeria

Natural and human-induced disasters come in many forms and it is when nature comes into conflict with humans that catastrophe results. For a hazard to be called a public disaster, according to Blong (1992), human life, property, and social infrastructure had to be lost to the event and socio-cultural attributes of people in such environment affected. In this regard, if windstorm causes havoc to thatch and mud structures in a remote hamlet, for example, the event may be dramatic but it is seldom a disaster. A disaster occurs when wind storm strikes a large city, fire outbreak in densely and congested market or residential area, bomb explodes in a densely populated settlement or a high-rise building collapses within a city's Central Business District (CBD) causing chain reaction collapse to structures within its vicinity. Thus, one cannot talk about disaster and vulnerability without considering where people have chosen to live and how densely they have spatially occupied the existing space (Zebrowski, 1997).

According to Blaikie, et al. (1995) and Martínez-Viveros and López-Caloca (2010), the impact of disasters must be interpreted as a

consequence of different structural situations that expose people and systems to danger. The authors believe that natural events, as determining factors of disaster, play a secondary role when compared to the socio-economic, political and physical environment. Consequently, vulnerability becomes the "active agent" in a disaster, not the natural phenomenon, which only serves to ignite preexisting, critical situations. Increased vulnerability increases the probability of disaster for the unit under analysis (people, places, social groups, systems). In other words, physical, political, socio-economic and demographic dynamics within the city's sphere, if not holistically managed, combine in a process that increases vulnerability and leaves people, individually or in groups, exposed to danger as they live or work in precarious areas, construct insecure buildings and infrastructure, or utilize unsound transport system. Vulnerability is acutely connected to people's ways of life, as individuals or in groups, and is related to their assets, access to resources (productive, natural, managerial, organizational) and their capacity to prevent, face, organize and adapt to disastrous events.

In Nigeria, environmental problems manifest in various forms and dimensions. For example, as noted by Adetunji (2006), every state of the federation across the various ecological zones suffers from one form of environmental ill or the other. The north is groaning under the effect of wind erosion which is aggravated by deforestation, drought, over-grazing and desertification. The coastal south 'washes' away into the ocean. Gully erosion opens the middle belt and most southern states especially in the south east. In addition to these, there are other environmental problems such as: bush burning, gas flaring, pollution, municipal waste disposal and above all the general rural and urban infrastructural decay.

One of the factors identified as contributing to the frequent natural disasters is climate change. Many Nigerian cities including Ibadan, Lagos, Jos, Portharcourt, Sokoto, Kaduna, Owerri, Yenegoa, Calabar, and Ado-Ekiti currently face high risk from climate change impacts.

Vulnerabilities are heightened by the poor quality of housing, infrastructure, drainage and sea defences. The realities of climate change are much more evident in several Nigerian coastal and inland cities where flooding has become more frequent, intense and occurring in locations previously not at risk. The coastal communities in Lagos, Ondo, Bayelsa and Rivers States are highly vulnerable to climate-induced risks such as sea level rise, storm surges and flooding while the inland cities are equally exposed to temperature increases, flooding, and windstorms. Their risk level is very high due to a combination of exposure to multiple hazards, poverty, overcrowding and a low adaptive capacity.

Disasters have assumed a dangerous dimension in Nigeria lately with far reaching implications on the location, physical characteristics, functional efficiency and quality of her rural and urban settlements. The flood disaster of 26 August 2011 in Ibadan left over 100 people dead and over 2,000 buildings flooded. In 2012, over 28 (80 percent) of the 36 states of the federation experienced flooding; there were several incidents of fire disasters, oil spillage, windstorm, erosion, building collapse, drought, temperature extreme and siltation. A six-hour of heavy rainfall which occurred in Ado-Ekiti on Sunday, 21 April, 2013 swept away three children and destroyed several buildings according to Sam Omatseye in the Nations Newspaper of 23rd April, 2013. In Cross Rivers State, Nigeria, rainstorm was reported by *The Nation* newspaper of Tuesday, 21 May, 2013 to have killed one 13-year old JSS 3 pupil and displaced 6,000 in Boki LGA of the state. Nasarawa State had its share of the flood disaster in 2012 during which nine (9) Local Government Areas were flooded namely: Akwanga, Awe, Doma, Karu, Kokona, Keana, Lafia, Nasarawa, and Toto. As a result, 200 communities were affected; 128 communities were displaced; 28 people confirmed dead; 94,538 people were internally displaced; Nasarawa state lost over 9000 hectares of cultivable farm land, and over N30 billion losses in total.

Also between January and May 2013, there were fire outbreaks in Lafia market, Keffi Market, residential buildings in Karu and Kokona.

The 53 fire incidents resulted in loss of 3 lives and properties worth N104 million. In 2012, about 104 fire incidents in the state recorded loss of 14 lives and properties worth N50.9million (Nasarawa State Emergency management Agency, NASEMA, 2013). *The Nation* Newspaper of Saturday, August 3, 2013 reported on the flood menace of August 2012 which ravaged Nigeria and Cameroon as a result of the release of excess water from Lagdo dam in Cameroon on August 24, 2012. The Nigerian Minister of Water Resources, Mrs. Sarah Ocheke, reportedly claimed that the flood led to the death of more than 49 lives, displacement of over 91,000 persons, and destruction of 117,978 structures in 16 local government areas of Adamawa, Taraba and Benue States in Nigeria. On the part of Cameroon, the Minister of Water and Energy, Dr. Basilie Atangana Kouna, reportedly said that about 40,000 Cameroonians were displaced due to the Lagdo dam flood. Still in 2012, the torrential rainfall coupled with the release of water from Lagdo (Cameroon), Kainji and Jebba (Nigeria) dams led to the flooding of 335 communities in nine LGAs of Kogi State which left 19 persons dead, 30,709 displaced, several infrastructure destroyed and businesses disrupted (*The Nation* Newspaper, 2013). A 24-hour of heavy rain which fell in Ibadan from Sunday to Monday 22 to 23 September, 2013 resulted in flooding during which two persons died and one was injured.

The natural hazards which Nigeria faces from time to time are ones that are aggravated by human activities and are almost always preventable (see Table 1). For example, desertification and or desert encroachment in the Sahel and Sudan savannah of the extreme north western and north eastern parts of the country can be stemmed by embarking on purposeful and functional enlightenment campaigns to prevent communities within these regions from felling trees indiscriminately for fuel wood. In addition, flood disasters can be controlled in most of the rural and urban settlements if people adhere to the minimum space standard between drain and building and by not building structures within and or along the natural flood plain of urban rivers. As opined by Nigerian Environmental

Study/Action Team [NEST] (1991), the increasing frequency and severity of floods in Nigeria do not stem from increased rainfall. Although rainfall amounts have, overall, been on the decrease, the increased floods are in response to the absence of well-articulated and comprehensive physical planning and development control in the country.

Table 1: Types of Hazards and Disasters

Natural	Human-made	Human-Natural
Windstorm	*Aviation (air crashes)	*Land degradation
Thunderstorm	*Arson	*Desertification
Hailstorm	Civil disorder	*Siltation
Winterstorm	*Motor accidents	*Erosion
Earthquake	*Power outage	
Avalanche	Radiation	
Hurricane	Siltation	
Volcano	*Terrorism (chemical, biological)/militancy	
	War	
Limnic eruption	*Building collapse	
Mudslide	*Conflicts (ethno-religious)	
Landslide	*Oil spillage	
Tornado	*Epidemic (cholera, bird flu)	
Tsunami or storm surges	*Industrial pollution	
*Droughts	*Solid waste	
*Floods	*Water failure	
Snow storm or blizzards	*Fuel shortage	
Famine	*Hostage taking	
Lightning	*Infant abduction	
*Natural fires	*Bomb threat	
Ice		
*Erosion		
Disease (e.g. meningitis)		
*Falling trees.		
*Pest infestation		
Temperature extreme (extreme cold or heat waves)		

*These are some of the prevalent hazards in Nigeria.

Source: Adapted from Shaba (2009), Microsoft Encarta (2008)

Ojo (2001) noted that the impact of natural and human-induced disasters on people and human settlements in Nigeria are becoming greater (see Table 2 for the losses resulting from flood disaster in Ibadan). This development is frequently caused by vulnerabilities created by human actions such as uncontrolled or inadequately planned human settlements, lack of basic infrastructure and the occupation of disaster-prone areas. Poverty and ignorance are also identified to be contributing to some of these problems. Therefore, the induced disasters exerted heavy toll on humans in terms of loss of lives, destruction of socio-economic infrastructure and the negative impact on already fragile ecosystems is equally colossal. Thus, in many parts of the country, natural and human-induced disasters will

Table 2: Rainfall induced floods in the city of Ibadan, Nigeria (1951 to 2013)

S/N	Date	Rainfall (mm)	Estimated Damage to Properties (Naira)	Estimated Loss of Lives
1.	9-10 July 1951	161	Unknown	Unknown
2.	16-17 June 1955	173	Unknown	Unknown
3.	16-17 August 1960	178	Tens of thousands of naira	Unknown
4.	27-28 August 1963	258	Tens of thousands of naira	At least 2 persons
5.	14 May 1969	137	Tens of thousands of naira	At least 2 persons
6.	1973(undated)*	Unknown	More than 100,000	3 persons
7.	20 April 1978	126	Over 2,000,000	At least 2 persons
8.	31 August 1980	274	More than 300,000,000	More than 500 with over 50,000 displaced
9.	1982 (undated)*	Unknown	Unknown	Unknown
10.	1984(undated)*	Unknown	Unknown	Unknown
11.	April 1986 (undated)*	Unknown	Unknown	Unknown
12.	June/July 1987 (undated)*	Unknown	Unknown	Unknown
13.	April 1997 (undated)*	151	Unknown	Unknown
14.	26 August 2011	187.5	Over 30 billion	Over 100
15.	14 July 2012**	Unknown	Unknown	Unknown
16.	23 September 2013***	Unknown	Unknown	At least 2 persons dead and 1 injured

Note: USD 1 = N156.

Sources: Nigeria Environmental Study Action / Team (NEST 1991, 107), National Water Resources Institute (2011, 10), *Akintola and Ikwuyatum (2012, 199), Agbola et al. (2012, 208), and **Author's update, ***Atoyebi, 2013

continue to occur. However, human actions will either increase or reduce the vulnerability of societies to disasters depending on the kind of practices they engaged in. For example, it has been documented in most of the Nigeria's settlements that, changing demographic and economic patterns resulting from rural-urban, inter- and intra-migration would lead to uncontrolled urbanisation and widespread poverty which would, invariably, push large number of people to live in disaster-prone areas. Similarly, there is a considerable possibility for the reduction of risks through the application of disaster abatement and mitigation efforts based on modern forecasting technology as well as improved human settlement plans and building practices.

4. Exposure and Vulnerability of Human Settlements to Disasters

The additional billion people added to world population in every 12 to 13 years are mortally taxing the earth and its resources. Each individual person has a unique impact on the planet's environment and no living individual is without an ecological footprint (Population Media Centre 2009). Available statistics show that more than half of the world's 7 billion people live in urban area, crowded into 3 per cent of the earth's land area. The proportion of the world's population living in urban areas which was less than 5 per cent in 1800 increased to 47 per cent in 2000 and it is expected to reach 65 per cent in 2030 (United Nations, 1990; and Population Reference Bureau, 2005). From this global view, however, more than 90 per cent of the future population growth will be concentrated in developing countries and a large percentage of this population will be the poor living in marginal land vulnerable to disasters (Drakakis-Smith, 2000; UN-Habitat 2007). Many of the world's mega-cities are already situated in locations prone to major earthquakes and severe droughts, and along flood-prone coastlines.

For instance, as noted by Ravallion (2001), the rapid growth of urban areas in the developing world in the next few decades poses a huge challenge to the fight against poverty. The problems of cities are of various dimensions: a significant increase in urban poverty, which is

disproportionately affecting women and children; ethnic and racial conflicts; crime; homelessness, and environment degradation with far-reaching political as well as socio-economic implications. To achieve successful sustainable development, urban poor must be the business of everyone. Cities with growing economy have the possibility, as least, of improving the condition of poor inhabitants. However, among the world's megacities with the highest rates of population growth are precariously poor cities with sluggish economies, such as Cairo, Calcutta, Dhaka, Kinshasa, Kano, Ibadan and Lagos. For these cities the risk of further deterioration is obvious and continuous (Sharma, Khan, and Warmock 2000).

A model which bridges the distinction between the rural and the urban is particularly important for the developing world, where the growth of cities has been the greatest. Casting a relief of sharply increasing inequality, postmodern cities bring about exclusiveness, social fragmentation and spatial segregation of the rich and the poor in terms of vulnerability to disasters. Vulnerability to disaster usually refers to the ability of an individual or a group to prepare, respond, cope and recover from a disaster (Robertson, 1992, and Blaikie et al., 1995). It is determined by a variety of social, economic, cultural and political factors, which define individual's or group's status, position and power in society. It also has a distinct spatial dimension, as people with similar characteristics tend to settle in the same or similar areas (Wisner, 2003).

Throughout history, one of the functions of settlements was to provide safety and protection to its inhabitants from disasters, onslaught of invaders or pest and pestilence. However, the concentration of wealth, knowledge and power in great cities made it also possible for the construction of some of the greatest projects to protect people and property from the vagaries of nature. Drainage and irrigation were the first mitigation projects designed to serve and protect ancient civilizations. To this day, cities have continued to employ their vast resources and greatest technological advances to protect themselves from biological, hydrological, meteorological and geological hazards (Mitchell 1999).

Post-modern urbanization has not only exacerbated many of the traditional rural and urban development processes that contribute to vulnerability (such as the spread of slums and the decay of old or undesirable neighbourhoods) but it has also changed the way rural and urban spaces are developed and managed, thereby creating new agents of vulnerability. Even in highly industrialized nations like Japan, the high cost of urban land in Tokyo encourages overcrowding, restricts open space and pushes new developments onto hazardous coastal areas in the paths of cyclones and tsunamis (Hoyois et al., 2007). While all social strata may equally be exposed to the risks of some hazards, in most cases, this exposure is determined by locations, which people choose or in which they are obliged to live (Velasquez et al., 1999).

Environmental degradation and global environmental change, particularly climate change, pose an exceptionally complex challenge to humanity by affecting vulnerability and hazard patterns (Strange, 2006 and The Punch Newspaper, 2007). Thus, environmental degradation and global environmental change increase the intensity of hazards and they are often the factors that transform the hazard into a disaster. For instance, floods are aggravated or even caused by deforestation, which in turn causes erosion and silt-up river channels. Poverty and vulnerability to disaster are linked to this situation (Martine and Guzman 1999 and Pantelic Srdanovic and Greene 2005).

The poor in rural and urban settlements are compelled to exploit environmental resources for survival, therefore, amplifying both susceptibility and exposure to disasters, in particular those triggered by floods, drought and landslide. The degradation of the environment is, therefore, the result of not only uncontrolled urbanization that swallows open spaces and agricultural land, interrupts natural drainage, patterns or denudes hillsides in pursuit of new urban land, but also of the breakdown in the ability of local populations and their governments to manage arable and urban land effectively. This breakdown is the inevitable consequence of fiscal retrenchment and the restructuring of the public sector that, in most cases, leaves the poor to fend for themselves as manifested in Nigeria.



Plate 1: Drainage channel on Alaro stream at Babalegba area, Eleyele, Ibadan - blocked with solid waste and debris during the 2011 flooding in Ibadan.
Source: Oyo State Government (2011)



Plate 2: Residential building built within statutory set-back of Ona River, Ibadan
Source: Oyo State Government (2011)



Plate 3: A make-shift bamboo foot-bridge constructed by Apete residents to facilitate movement of children and adults from Apete to the rest of the Ibadan city after the concrete bridge on Ona River was swept away by the flood of 26 August, 2011. See the state of fear in the children as they are being assisted to walk on the foot-bridge.

Source: Wahab, B. (01 September, 2011)



Plate 4: Flooded area in Lagos, 12 July 2011

Source: Akoni, O. et al.

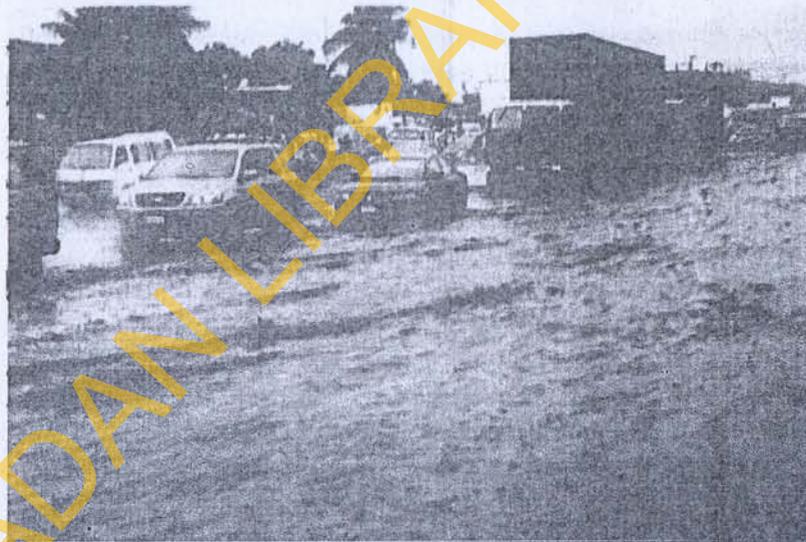


Plate 5: A Flooded area of Lagos

Source: Kingsley Adegboye, 16 March 2012



Plate 6: A Typical Public Drain Behind Jankara Market By Ojo-Giwa Street, Lagos Island

Source: The Author, 2012

5. Disaster Management Strategy

Disasters seek out the poor and ensure they stay poor (Cherpitel 2002). They are often the most exposed to disasters and with the lowest capacity to cope. Inversely, where the rich may be exposed to disaster through locational choices such as flood plains, hill tops, ocean fronts; they have adequate capacity to cope with associated disaster impacts (International Federation of Red Cross and Red Crescent Societies (IFRCRCS, 2002). In general, the drama of disaster and the urgent international activity to provide emergency relief commands the attention of the international media for only a few days. However, the consequences of disasters last much longer and are more poignantly measured in isolation. These losses impede human development and often erode previously hard-won individual and national accomplishment. Disasters also compromise current and future resources upon which societies and future generations depend. More effective prevention strategies would save not only tens of billions of dollars, but save tens of thousands of lives. Funds currently spent on intervention and relief could be devoted to enhancing equitable and sustainable development instead, which would further reduce the risk for war and disaster. Building a culture of prevention is not easy. While the costs of prevention have to be paid in the present, its benefits lie in a distant future. Moreover, the benefits are not tangible; they are the disasters that did NOT happen (Kofi Annan 1999).

A major goal of emergency management is to minimize the adverse impact of a disaster on a business, community or large geographic area. The efforts of many organizations to build a more sustainable community, business or country are consistent with emergency management goals of hazard mitigation (McGuire, 2000). In 1987 the United Nations World Commission on Environment and Development coined the term sustainable development. It defined sustainable development as "meeting the needs of the present generation without compromising the ability of future generations to meet their own needs". This means that harvesting natural resources and developing land, must be done in a manner that will

allow other generations to have at least the same opportunities that currently exist (Aguirre, 2002; and Pine, 2003).

For any management method to be successful, it requires mass participation, which not only gives strength but also legitimacy and ownership to the project. Thus, when awareness and education about disasters are provided to people, disaster management becomes a simpler task. One of the causal factors of vulnerability of a population is lack of awareness and education about disasters. It is also the only factor, which can be tackled very easily and immediately. For example, according to Wisner (2001a) while poverty cannot be eliminated in a developing country like India, ungoverned population growth has been controlled to some extent through public education and awareness. Rapid urbanization and migration cannot be stopped at present because it would take many years; transition in the cultural practices cannot be stopped that easily, which again is a slow process and to a greater extent depends on the people's mind-set. However, vulnerability to disaster can be addressed through functional public awareness and education.

In view of the above, Thompson (1995) opined that in a given country, what is important in the efforts to reduce disaster is to prescribe an appropriate feasible package of measures that are not limited to conventional counter-disaster activities. Such a package, for instance, most likely includes a rural and urban development programme, with particular emphasis on watershed rehabilitation and literacy campaign measures not regarded usually as counter-disaster measure. There is, however, no universally applicable package of right action. Most often, the structure of disaster vulnerability is unique to each country and settlement, therefore, comprehensive package cannot be prescribed without thoroughly scrutinizing how and why the country or settlement in question is vulnerable. For example, following the extensive flooding that covered almost three-quarters of Bangladesh in 1987, the Bangladeshi officials launched a three year Flood Action Plan to study more than 25 different dimensions of flood prevention. The

resulting recommendation overwhelmingly suggested the need for much greater investment in “flood-proofing” the society by learning to live with the inevitable floods in a way that would minimize harm and loss, rather than trying to prevent the powerful forces of nature. Findings were ultimately guided by the fact that almost the entire country of Bangladesh is a highly fertile flood plain. It would neither exist, nor be as productive as it is without the annual floods continually renewing and extending its landscape (ISDR, 2002).

Preparedness and response to disaster as opined by Ijewere (2003), are not solely the work of expert and emergency-responders from government disaster organisations. Local volunteers, citizens, organisations and businesses have an active and important role to play before, during and after major emergencies and disasters. Therefore, Community Based Disaster Preparedness (CBDP) that seeks to develop and implement a locally owned strategy for disaster risk reduction and preparedness is of paramount importance. The local population in disaster stricken areas is the first to respond to a disaster in terms of search and rescue as well as providing emergency treatment and relief for families, friends and neighbours. The management of disaster is primarily the prerogative and duty of governments. However, a multi-sectoral and multi-disciplinary cooperation between government agencies, community based organisations, corporate bodies, non-governmental organisations and other networks in disaster abatement and management is a critical one (Wisner, 2001b; and Frances and Hanlon, 2001).

Many natural hazards, such as earthquakes, volcanoes, and hurricanes are unavoidable, but measures can be taken to minimize their impact. Taking flood hazard for instance, mitigation measures to reduce the potential impacts include:

- Flood impacts can be reduced by engineering solutions, involving water storage and embankments, and warnings and advice given to the public in advance of major storms. When Hurricane Andrew struck Florida in 1992, it caused \$12 billion of damage, but due to the advance warning of the storm only 50 people died;

- Aggressive tree planting and maintenance, on all free spaces within residential, industrial, commercial estates and along streams and rivers especially to secure flood plains and wetlands;
- Provision of designated waste dumps, transfer stations and landfills and regular emptying or tipping of the waste dumps and recyclable materials recovered rather than setting on fire so as to reduce greenhouse gas (GHG) emissions;
- Organized drains should be constructed along all categories of roads in any settlement so as to collect storm water from building areas and hard surfaces to prevent erosion and possible flooding;
 - Drains should be made free from waste dumping and sand deposit to prevent flooding;
 - Disasters, e.g. flood and fire can be controlled through adherence to physical planning standards and building regulations especially by not erecting buildings on the flood plain and under high tension wire;
 - Rainwater harvesting should be encouraged in individual homes, community halls, public buildings such as schools, healthcare facilities so as to reduce the volume of rain water run-off and eventual flood water.

6. Developmental Attributes of Disaster

Disasters constitute a development issue because they can make development risky and unsustainable while development processes can cause or reduce disaster risks. Losses from disasters negate some development gains and exacerbate poverty, partly because natural hazard vulnerability causes, exacerbates or is linked with other vulnerabilities and risks. Due to the inter-relationships between disaster risk and developmental attributes, effective disaster risk reduction strategies most strive to mainstream and ensure sustainable development (ISDR 2006).

As rightly noted by UNDP (2004), development patterns that do not balance wealth creation, equity or environmental soundness are unsustainable and cause disaster risks, mainly through worsening

underlying factors of vulnerability to hazards or contributing to conditions that cause or exacerbate environmental degradation. In contrast, sustainable development strengthens the security of populations, hence, disaster reduction interventions can effectively help to alleviate or avoid disaster risks to the community's livelihoods, the supporting physical, economic and social base. This mutually beneficial relationship between reducing disaster risks and ensuring sustainable development occurs when disaster losses are addressed in a development context and development processes and patterns adequately address threats from disasters and other livelihood risks (ISDR 2006).

Although a number of studies had been published previously on the theme of disasters and social change but the first systematized and comprehensive series of ideas on the ways disasters may interrupt development processes, whilst, at the same time, offering opportunities for future development was developed by Fred Cuny published seminal work on "*Disasters and Development*" in 1983. As noted in the work, the recovery process could serve as opportunity to build disaster risk reduction mechanisms into post-disaster development planning. Disaster-development relationships should be reconsidered as development priorities are thought through. Importantly, it is not just local actors, but national and international actors who should be involved in these reflections. Disruptions caused by disasters create avenue to open up political space for alternative forms of social networking that enhance egalitarian forms of organization to develop. Support for such organisations could be a way in which new development priorities are carried forward beyond the immediate response and recovery periods.

Integrating the results of society's responses and reconstruction activities into post disaster interventions clearly indicate that disasters are problems for development. However the results of numerous studies carried out in regions affected by disaster show that in many cases there are marked development gains in the medium and long terms. This should not be surprising taking into

account the argument that disasters can be opportunities for development. The flood disaster of 26 August, 2011 in Ibadan which washed away old bridges in Apete, Bodija and Ogbere-Babanla, and Olomi turned out to be a blessing to those communities as five bigger and standard bridges that can accommodate very large volume of storm water are currently being constructed by the State Government to replace the damaged and weak ones in Bodija, Apete, Ayeye, Ayegun-Olode (near Olomi), and Ogbere-Babanla. A new alternative road constructed of asphalt overlay with concrete drains on both sides has been constructed and commissioned by the Oyo State Government from the northern end of the University of Ibadan through Ajibode to Osajin to link Apete. By the time the new bridge over Ona River on the old road is completed and opened for use, the teeming population of Apete-Awotan community would be greatly relieved of the morning and evening traffic deadlocks they experienced on daily basis. In addition, the Oyo State Government in response to the 2011 flood embarked on the dredging of 43 rivers and streams across all the 33 LGAs in the State (Atoyebi, 2013). New investment, improved quality of housing, infrastructure and production, and overall gains in risk reduction can be expected to occur where the reconstruction process is adequately conceived. Moreover, it has also been documented in various areas affected by disaster that new investment has greatly exceeded calculated disaster losses and reconstruction needs as stipulated in post disaster assessments (Lavell 1999).

Disasters are popular events and responses may be driven by social, economic, political or ethical reasons. The response could lead to significant positive changes in the local or regional economy and society. In an unintentionally cynical way of looking at the disaster – development spectrum is that disasters could be seen as abrupt writing off of redundant, depreciated capital. However, the argument that disasters may lead to greater development, at least in the affected regions, is not an argument for letting them happen. It is just a statement on the nature of the process. Crisis provides opportunity. Disasters reveal distinct aspects of underdevelopment,

expressed through the presence of vulnerability. Given this, it is not surprising that what happens after disaster may, many times, be better than what existed before. The contradiction is, of course, that many regions and population groups have to await a disaster in order to have any opportunity to gain a minimal access to development resources (Lavell 1999). This is the case in Lagos where the State Government was not able to dredge some canals that were blocked by solid wastes and building structures as a result of resistance by residents who built illegal structures along the canals, on watersheds and flood plains. The devastating floods of 2011 and 2012 and its accompanying loss of lives and properties gave the Lagos State Government the opportunity to dredge several canals that were blocked with solid waste and debris for easy flow of storm water in many communities with the least resistance. According to information obtained from the Drainage Department of the Lagos Ministry of Environment, between 2007 and 2012, 174 drainage channels of a total length of 77, 899 metres were dredged out of which 152 were lined as a disaster risk reduction measure.

7. **The Role of Urban and Regional Planners in Disaster Risk Management**

Urban and regional planning is a key tool to assist city managers and their communities build resilience to risks and natural disasters through effective adaptation measures. However, due to insufficient information and inadequate preparations, some disasters, especially floods, drought, erosion, fire and oil spillage, still strike Nigerian communities with devastating impacts.

The involvement of urban and regional planners in all the stages of disaster management is quite obscure; they are not involved in DRR education, preparedness, response, recovery, risk and vulnerability assessment and plan production, rural and urban development programmes e.g. watershed protection and rehabilitation plans, flood/fire/drought action plan. They also rarely participate in public consultation and sensitization programmes organized by NEMA and SEMAs on disaster risk management while the physical planning

Ministries and Local Planning Authorities have themselves not organized any activity on any aspect of disaster risk management. However, the flood assessment exercise of the August 26, 2011 flood disaster which ravaged the whole city gave the staff of Oyo state Ministry of Physical Planning and Urban Development and the staff of the eleven Local Planning Authorities in the city of Ibadan the opportunity to participate in the assessment of causes and consequences of the flood disaster including the determination of the number of affected buildings and infrastructure, and the adequacy of existing statutory setbacks to streams and rivers within the flooded areas. They were trained on the use of GPS to reference the flooded buildings, their setbacks to water bodies, and gradient of the surveyed areas by the Task Force on Flood Prevention and Management set up by the Oyo state Government to handle the flood assessment from September to November, 2011. The 12-member Task Force had five Urban Planners (one of whom was made the Chairman) drawn from academics (2), Nigerian Institute of Social and Economic Research (1), Ministry of Physical Planning and Urban Development (1) and Local Planning Authority (1).

Disaster risk management should be of great concern to physical planners whether in public sector, planning schools or private practice given the fact that human activities, especially physical developments, constitute an important anthropogenic cause of flooding. Planning schools' curricula are deficient in DRR and DRM strategies. There is at 2013 no stand-alone DRM course in the curricula of planning schools both in the Polytechnics and the Universities, and also in the curriculum of the professional examination of the NITP and TOPREC. The regulatory bodies of Urban and Regional Planning education and practice should seize the opportunity of the 2013 MCPDP to include DRM in the existing curricula of planning schools and professional examinations.

Awareness of DRM by planners in the civil service is low and the required tools are not available. Planning control of development is weak and ineffective to the extent that developers are allowed to build all kinds of structures (residential, commercial, religious,

educational and service industries) by the edge of streams, on stream courses on flood plains/wetlands, on drainage channels and even streets. The effects of these illegal developments and contraventions are seen in the obstruction of free flow of storm water whenever it rained, leading to back-flow of storm water into streets and every available spaces leading to flooding and loss of lives and properties. This is a major issue for physical planners to address using the instrumentality of planning laws, space standards and building regulations.

Other areas that need urgent attention of physical planners in the whole business of disaster risk management are as follows:

- Physical planning consultants should initiate and pursue the preparation and actualisation of DRM strategies and action plans with federal, state and local governments and communities.
- Hazard awareness and DRR strategies should be integrated into rural and urban physical development planning to reduce disaster losses, poverty and vulnerability.
- DRR and DRM modules should be taught in planning schools and hands-on practical undertaken in the form of life projects in partnership with public- and private sectors and the civil society groups.
- Physical planning ministries and planning authorities should undertake risk identification exercise in all settlements within their areas of jurisdiction, initiate and coordinate the preparation of vulnerability maps covering each local government area.
- Physical planners should collaborate with disaster risk management agencies and committees at the federal, state, local and community levels in disaster preparedness and post-calamity management activities in order to significantly reduce the number of fatalities and socio-cultural and economic damages from disaster events.
- Disaster Risk Management campaign is an investment and not a cost; physical planners should therefore, see this as their

routine business.

- Planners should get actively involved in sustainable disaster management initiatives: preparedness, mitigation, and risk reduction in Nigeria's rural and urban settlements.

8. Conclusion

Disasters occur when societies or communities are exposed to potentially hazardous events, such as extremes of rainfall (rainfall too much or too little), temperature or wind speed or tectonic movements, and when people are unable to absorb the impact or recover from the hazardous impact. Natural and human-induced disasters come in different forms and are caused by socio-economic, geographical and technological factors. The growing trend in world urbanization is increasing the incidence of flood and fire disasters in various parts of the world. In Nigeria, wind and gully erosion, drought, flood, rainstorms and fire disasters have exacted heavy toll on humans in terms of loss of lives, property and ecosystems in urban and rural settlements. In all of the situations, vulnerable groups lacked the capacity and capability to prepare for or mitigate the emergencies whenever they occurred.

While it is commonplace to talk about natural disasters, both vulnerability and hazard are conditioned by human activities. There is a wide spread awareness of risk in the environment and the growing recognition that the toll exerted by disaster is unacceptable, it will be defeatist not to bring hazard awareness into development planning because continuing disaster losses simply reinforce poverty and vulnerability. Disaster impact in Nigeria needs to be reduced to the point where stable investment can take place and the indigenous skills and energy, on which long term development depends, can be realised. The most urgent requirement is to improve the situation of the most vulnerable people at risk.

The extent and impact of potential disasters are changing exponentially, therefore, the world is increasingly characterised by uncertainty, complexity and rapid change. Although causal factors and consequences are increasing globally, human vulnerability is

intensifying in distinctly different ways at local and regional levels. The scale of crisis impacts is also intensifying with more and more disasters undermining economic and political systems, destroying infrastructures and eroding the fabrics for future development.

The nature and intensity of natural and human-induced disasters' impacts on the environment have multifarious effects on the inhabitants. Thus, the extent to which human settlements in Nigeria will be habitable and resilient to disaster will no doubt depend on the concerted efforts of everybody that has a stake in it; taking into consideration the increasing rate of urbanisation and deficiency in articulated and comprehensive land use planning in the study area - an obvious shortcoming of the 1992 Urban and regional Planning Law. Since disaster reduction is based on a continuous strategy of risk and vulnerability assessment, exclusion of relevant actors drawn from governments, technical and educational institutions, research institutes, professionals, commercial interests and local communities has undermined disaster management strategies in the study area. Stakeholders should be integrated inclusively into planning and development strategies that enable and encourage the widespread exchange of information. In other words, new multidisciplinary relationships are essential if disaster reduction is to be comprehensive and sustainable.

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